4.0 AFFECTED ENVIRONMENT

This section describes the socioeconomic, physical, and biological environment of the ATG Site; the 200 West Area at Hanford Site, where wastes are in temporary storage and where the treated waste would be stored for eventual disposal; and the proposed 33 km (20 mi) waste transport route. The purpose of this assessment is the identification of potential environmental impacts of the proposed action.

The Hanford Site Environmental Report for Calendar Year 1995 (PNNL 1996) and Hanford Site National Environmental Policy Act (NEPA) Characterization (Neitzel 1996) are hereby incorporated by reference. These documents describe the affected environment for the Hanford Site and are the principal sources of the selected information presented in this section. The affected environment at the ATG Site is assumed to be similar to areas at the Hanford Site because of its close proximity. Information is supplemented where environmental conditions described in the referenced reports may not fully reflect conditions at the ATG Site.

4.1 LOCATION OF THE PROPOSED ACTION

Facility Description

The ATG Site is located at 2025 Battelle Boulevard in Richland, Washington (Figure 2.1). The MWF would be located on the existing 18 ha (45 ac) site. This site is near the Hanford Site boundary in an industrial area in the City of Richland and is approximately 0.8 km (0.5 mi) south of Horn Rapids Road and 1.6 km (1 mi) west of Stevens Drive in the northwest quarter of Section 22, Township 10 North, Range 28 East, Willamette Meridian. The property is situated within the Horn Rapids Triangle in northern Richland.

The Central Waste Complex is located in the 200 West Area in the west-central area of Hanford Site. The transport route would extend from the 200 West Area along Route 3 to Route 4 South to Stevens Drive (within the Hanford Site boundary), from Stevens Drive to Horn Rapids Road (outside of Hanford Site) to the ATG Site (Figure 2.1).

4.2 SOCIOECONOMIC ENVIRONMENT

Activity on the Hanford Site plays a dominant role in the socioeconomics of the Tri-Cities and other parts of Benton and Franklin Counties. The agricultural community also has a significant effect on the local economy. The Hanford Site dominates the local employment picture with almost 22 percent (15,767 jobs) of the total nonagricultural jobs in Benton and Franklin Counties in 1995 (72,200 jobs). Major changes in Hanford Site activity potentially would affect the Tri-Cities and other areas of Benton and Franklin Counties (Neitzel 1996).

The total number of employees at the ATG Site is projected to be approximately 200. This includes approximately 100 employees for low-level waste treatment and 100 employees for LLMW treatment. Approximately 40 employees would be involved directly and 10 employees would be involved indirectly (i.e., support staff) with the non-thermal treatment operations. Because the waste volumes are small in comparison to the treatment capacity of the stabilization process, no additional ATG personnel would be required to treat the waste addressed in this EA.

No additional DOE contractor employees would be required to support the activities under this action at the Central Waste Complex.

4.3 ENVIRONMENTAL JUSTICE

On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," which is intended to prevent disproportionate adverse environmental or economic impacts from Federal policies or actions to minority and low-income populations. Demographic information on ethnicity and race in Benton and Franklin Counties is presented in Table 4.1.

Table 4.1. Population of Benton and Franklin Counties by Race and Ethnic Origin

Race or Ethnicity	Benton County				Franklin County			
	1990 Population	% of 1990 Total	1994 Population	% of 1994 Total	1990 Population	% of 1990 Total	1994 Population	% of 1994 Total
White	102,832	91.4	113,569	89.4	26,917	71.8	26,668	62.2
African American	1,085	0.96	1,400	1.1	1,310	3.5	1,312	3.1
American Indian, Eskimo, or Aleut	861	0.76	992	0.78	263	0.7	318	0.7
Asian or Pacific Islander	2,246	2.0	3,113	2.45	869	2.3	1,367	3.2
Others	5,536	4.9	7,926	6.3	8,114	21.7	13,235	30.8
TOTALS	**112,560**	**100.02** [1]	**127,000**	**100.03**	**37,473**	**100.0**	**42,900**	**100**
Hispanic Origin [2]	8,624	7.7	12,360	9.73	11,316	30.2	16,662	38.8

Notes:

[1] Totals may not equal to 100% due to rounding.

[2] Hispanic Origin can be any race. It is not included in the percentage total.

Sources: U.S. Bureau of Census (1990); Office of Financial Management (1994).

The data in Table 4.1 indicate that the minority population in Franklin County is greater than in Benton County and the minority population in both counties has increased during the years 1990 to 1994.

Both the Council on Environmental Quality and the U.S. Environmental Protection Agency (EPA) identify low-income populations using annual statistical income thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty. The 1990 Small Area Income and Poverty Estimate for Benton County, published by the Bureau of Census, indicates that 11 percent of the population was below the poverty level, and the estimate for Franklin County was 22.7 percent. In 1990, the Washington State population was 4,741,003, with approximately 517,933 or 10.9 percent of the total population below the poverty level (U.S. Bureau of Census 1990).

4.4 PHYSICAL ENVIRONMENT

The ATG Site is located near the DOE Hanford Site boundary, approximately 2.8 km (1.75 mi) south south-west of the 300 Area, and is in a semiarid region. The Cascade Mountains to the

west greatly influence the area's climate by providing rainshadow. This range also serves as a source of cold air drainage, which has a considerable effect on the area's wind regime.

Predominately, winds at the Hanford 300 Area Meteorological Station are from the southwest and northwest. Monthly average wind speeds are lowest during November, averaging approximately 10 km/hr (6 mi/hr), and highest during June, averaging approximately 15 km/hr (9 mi/hr). Wind speeds that are well above average are usually associated with southwesterly winds. However, the summertime drainage winds are generally northwesterly and frequently reach 50 km/hr (30 mi/hr) (Neitzel 1996).

Winds at the Richland airport predominantly are from the south-southwest or the north-northwest. Wind speeds average 10 to 11 km/hr (6 to 7 mi/hr) during the winter and 13 to 16 km/hr (8 to 10 mi/hr) during the summer.

Severe high winds are often associated with thunderstorms. On average, the ATG vicinity experiences 10 thunderstorms per year, most frequently (80 percent) during May through August.

Good atmospheric dispersion conditions exist about 57 percent of the time during the summer (PNNL 1996). Less favorable dispersion conditions occur when the wind speed is light and the mixing layer is shallow. These conditions are most common during the winter when moderately to extremely stable stratification exists about 66 percent of the time. The probability of an inversion period (e.g., poor dispersion conditions) extending more than 12 hours varies from a low of about 10 percent in May and June to a high of about 64 percent in September and October (Holzworth 1972).

Although fog has been recorded throughout the year, nearly 90 percent of the occurrences are during the late fall and winter months. Other phenomena that restrict visibility to 10 km (6 mi) or less include dust, smoke (typically from wildfires, orchard smudging [e.g., using oil-fired heaters to protect fruit crops during springtime freezes]), and agricultural field burning. Reduced visibility from blowing dust occurs an average of five days per year, and reduced visibility resulting from smoke occurs an average of two days per year.

Average monthly temperatures vary from -1 degrees centigrade (°C) (30 degrees Fahrenheit [°F]) in January to 24°C (76°F) in July, with a yearly average of 12°C (53°F). On the average, 51 days during the year have maximum temperatures greater than or equal to 32°C (90°F), and 12 days have a maximum greater than or equal to 38°C (100°F). Also, an average of 25 days during the year have maximum temperatures less than 0°C (32°F), and 106 days per year have minimum temperatures less than 0°C (32°F).

The average annual precipitation measured is 16 centimeters (cm) (6.5 inches [in.]) with over half of this occurring from November through February. December, the wettest month, receives an average of 2.5 cm (1 in.), while July, the driest month, averages 0.5 cm (0.2 in.) of precipitation. The annual average snowfall is 38 cm (15 in.).

Air Quality

Air quality in the area surrounding the ATG Site is generally good. However, ambient concentrations of particulate matter occasionally exceed regulatory standards. These elevated concentrations are believed to result from natural sources such as the dust storms and brush fires that occur in arid eastern Washington State (Neitzel 1996).

National Ambient Air Quality Standards have been established as mandated in the Clean Air Act. Ambient air refers to air outside of buildings to which the general public has access. The National Ambient Air Quality Standards define levels of air quality that are considered protective of public health (primary standards) and welfare (secondary standards). The standards exist for the following criteria pollutants: sulfur oxides (measured as sulfur dioxide), nitrogen dioxide, carbon monoxide, PM-10 (particle matter that is less than 10 micrometers [0.0004 in.] in diameter), lead, and ozone. The air quality standards specify maximum allowable pollutant concentrations and frequencies of occurrence for averaging periods ranging from one hour to one year, depending on the pollutant. Washington State has largely adopted the current Federal standards. However, Washington State has established more stringent standards for sulfur dioxide and ozone and also maintains an air quality standard for total suspended particulates and gaseous fluorides.

Air quality monitoring data adjacent to the ATG Site on the Hanford Site are available for nitrogen oxides and volatile organic compounds (PNNL 1995). The nearest monitoring station on the Hanford Site is approximately 3.0 km (1.8 mi) north-northeast from the ATG Site. Monitoring of nitrogen oxides was discontinued after 1990 because the primary source (the Hanford Site Plutonium-Uranium Extraction [PUREX] Plant) ceased operation. The highest annual average nitrogen oxides concentration was approximately an order of magnitude below the Federal and Washington State standard of 0.05 parts per million (Neitzel 1996).

Ten volatile organic compound samples were collected on the Hanford Site and analyzed in 1994. The samples were analyzed for halogenated alkanes and alkenes, benzene, and ethylbenzenes. Overall, the concentrations measured in 1994 were within the range of values reported in previous studies and also were well within guidelines and allowable regulatory limits (PNNL 1995).

During 1993, monitoring near the Hanford Site showed the 24-hour particulate matter standard of 50 micrograms per cubic meter ($\mu g/m^3$) being exceeded twice at the Columbia Center monitoring location in Kennewick. The maximum 24-hour concentration of 150 $\mu g/m^3$ was exceeded twice, with the highest level reaching 1,166 $\mu g/m^3$. The suspected cause was windblown dust. The annual primary standard of 50 $\mu g/m^3$ was not exceeded.

Radiological data were collected during 1995 through a network of 47 continuously operating samplers at Hanford Site radiological monitoring stations, at the Hanford Site perimeter, and at nearby and distant communities. Cesium-137, plutonium-239, plutonium-240, strontium-90, and uranium were consistently detected in air samples collected in the Hanford 200 Areas located approximately 25 km (15 mi) northwest of the ATG Site. Concentrations were higher on the Hanford Site than those measured at locations off the Hanford Site and were in the same range as measured in previous years. Emissions from Hanford Site facilities resulted in doses to the public that were lower than the applicable standards (PNNL 1996).

ATG continuously monitors radiation levels at the ATG Site perimeter using both continuous air samplers at four fixed-compass-direction locations and thermoluminescent dosimeters for external radiation dose measurement. Additionally, air is sampled at all release or ventilation points to measure radionuclide emissions (Jacobs 1998).

Radionuclide emissions from ATG facilities during the year of 1996 were 1.4E-10 Ci/year of manganese-54, 2.0E-10 Ci/year of cobalt-60, 1.7E-10 Ci/year of cesium-137, 3.0E-10 Ci/year of bismuth-214, 2.4E-10 Ci/year of lead-214, and 2.0E-09 Ci/year of radium-226 (ATG 1997). These facility emission levels would result in a radiological dose of 4.9E-08 mrem/year for a maximally exposed individual (MEI) at the facility boundary, which is well below the standard of 10 mrem/year (Jacobs 1997).

Geology and Soils

The current topography at the ATG Site is flat. All disturbed areas are graded to conform to the surrounding topography and drainage systems.

The facility is situated on stable soils. Soil at the ATG Site has been disturbed, so there would be only a small amount of additional soil disturbance during facility activities. Activities would involve temporary disturbances to soil outside the facility footprint, primarily in the trample zone around work areas, heavy equipment traffic areas, and material laydown areas.
Temporary impacts would include soil compaction and increased potential for soil erosion. However, the total area of disturbance would be approximately 2 ha (5 ac) and within areas previously disturbed by Site activities or agricultural production. Previous site activities include clearing and graveling the surface and constructing access roads within the fenceline.

Seismic Activity

The U.S. Nuclear Regulatory Commission (NRC) concluded that four earthquake sources should be considered for seismic design; the Rattlesnake-Wallula alignment, Gable Mountain, a floating earthquake in the tectonic province, and a swarm area (a floating earthquake) (NRC 1982).

For the Rattlesnake-Wallula alignment, which passes along the southwest boundary of the Hanford Site, the NRC estimated a maximum magnitude quake of 6.5, and for Gable Mountain, an east-west structure that passes through the northern portion of the Hanford Site, a maximum magnitude quake of 5.0. These estimates were based on the inferred sense of slip, the fault length, and/or the fault area. The floating earthquake for the tectonic province was developed from the largest event located in the Columbia Plateau, the magnitude 5.75 Milton-Freewater earthquake. The maximum swarm earthquake for the Washington Public Power Supply System Plant 2 seismic design was a magnitude 4.0 event, based on the maximum swarm earthquake in 1973 (NRC 1982). The most recent probabilistic seismic hazard analysis calculated an annual probability of recurrence of a 0.2 g earthquake at 5E-04 (WHC 1994).

Water

There are no natural perennial surface water bodies within 150 meters (m) (500 feet [ft]) of the ATG Site. The principal river systems within the region surrounding the ATG Site include the Columbia and the Yakima Rivers; however, the ATG Site is not within designated 100-year or

500-year floodplains of either river system (ATG 1995). A small intermittent surface stream is located about 0.8 km (0.5 mi) west of the ATG Site. The 200 West Area is not within the area of probable maximum flood (DOE 1986). Portions of the 33-km (20-mi) proposed waste transport route, however, are within the 100-year floodplain of both the Yakima and the Columbia Rivers (DOE 1986).

On the Hanford Site, smaller surface streams include Rattlesnake Springs, Snively Springs, Cold Creek (ephemeral), and Dry Creek (ephemeral). No wild or scenic river segments are present within the region of influence.

Groundwater in the southeastern portion of Hanford Site and in the vicinity of the ATG Site is less affected by Hanford Site operations than by agricultural irrigation cycles and growing seasons in and around Richland (Newcomer et al. 1992). The aquifer near the ATG Site is recharged both naturally (e.g., via surface water bodies and precipitation) and artificially (e.g., via irrigation, canal seepage, and industrial discharges). Artificial recharge is primarily by the north Richland recharge basins and by irrigated farming in the north Richland area. Groundwater depth at the ATG Site is slightly greater than 3 m (10 ft) (Ecology 1995). The ATG Site is not over a sole source aquifer, as defined in the Safe Drinking Water Act, and is not located in a groundwater management area. No public or private domestic water supply wells are known to exist within 150 m (500 ft) of or downgradient of the ATG Site.

Groundwater in the 200 Areas is strongly influenced by the discharge of large quantities of wastewater to the ground over the last 50 years, which has resulted in elevated water levels across most of the Hanford Site. Discharges of water to the ground have significantly reduced, resulting in decreases in the water table of up to 9 m (29.5 ft) in the 200 Areas.

4.5 ECOLOGY

4.5.1 Terrestrial Biota

Vegetation. Approximately six percent of the 1,450 km^2 (560 mi^2) Hanford Site is developed, and the balance of the site is undeveloped. Hanford Site vegetation is characterized as a shrub-steppe ecosystem (Neitzel 1996). For a complete list of species and a more complete description of habitat types, refer to the Hanford Site NEPA Characterization Report (Neitzel 1996).

The Hanford Site also includes 655 km^2 (257 mi^2) of land designated for research or as wildlife refuges, including the Arid Lands Ecology Reserve, U.S. Fish and Wildlife Service Saddle Mountain National Wildlife Refuge, and the Washington State Department of Fish and Wildlife Wahluke Slope Wildlife Area (Neitzel 1996).

The ATG Site is located within an area of north Richland zoned for heavy industrial uses. Some of the land within the ATG Site and the zoned area remains under agricultural cultivation. Vegetation on the ATG Site also includes shrubs and a variety of wild mustards and sagebrush plants sparsely scattered throughout the site. Site vegetation is dominated by nonnative weeds, including Russian thistle.

Wildlife. Common bird species in the vicinity of the ATG Site include the western meadowlark, white-crowned sparrow, gull, black-billed magpie, American crow, and European starling. Canada geese, red-tailed hawk, and American kestrel are common and are likely to occasionally feed in nearby grain fields (City of Richland 1998).

Approximately 240 terrestrial vertebrate species have been observed at Hanford Site including 40 mammal, 187 bird, 3 amphibian, and 9 reptile. Approximately 600 insect species also have been observed at Hanford Site (Neitzel 1996). The Tri-Cities area is within a major waterfowl flyway and wintering area. Waterfowl use is concentrated along the Columbia River, with limited waterfowl presence at the 200 West Area and in the immediate vicinity of the ATG Site.

4.5.2 Aquatic Biota

Hanford Site includes two types of natural aquatic habitats-the Columbia River and small spring-streams and seeps located mainly on the Arid Lands Ecology Reserve. These habitats include numerous species of phytoplankton, periphyton, macrophytes, zooplankton, benthic organisms, insects, and fish. Fish species common to the Columbia River include the Chinook salmon, sockeye salmon, coho salmon, and steelhead trout. Common waterfowl species include Canada goose, several species of ducks, and coot. A complete species list for the Hanford Site can be found in Neitzel (1996).

Larger Hanford Site wetlands are found along its Columbia River border. The width of the wetlands vary but may include extensive stands of willows, grasses, various aquatic macrophytes, and other plants (Neitzel 1996). Other wetlands areas within the region of influence are within the Saddle Mountain National Wildlife Refuge, Wahluke Wildlife Area, and the Arid Lands Ecology Reserve (Neitzel 1996). No wetlands are found in the immediate vicinity of the ATG Site.

Because there is no surface water in the immediate vicinity of the ATG Site there are no aquatic species. However, the ATG Site is about 3 km (2 mi) west of the Columbia River and is in its region of influence. The ATG Site elevation is about 10 m (30 ft) above the average surface elevation of the river along the Hanford Reach.

4.5.3 Endangered and Threatened Species

No threatened or endangered plant or animal species are known to exist or are suspected to be present on the ATG Site. Table 4.2 provides a list of threatened or endangered plant or animal species known to exist on or near the Hanford Site, which is in close proximity to the ATG Site. The absence of native vegetation and the industrial nature of the area render it unlikely habitat for such species.

Table 4.2. Threatened and Endangered Species

Common Name	Scientific Name	Federal	State
Insects			
Oregon silverspot butterfly [2]	*Speyerra zerone*	T	T [1]
Plants			
Columbia milk-vetch	*Astragalus columbianus*		T

Columbia yellowcress	*Rorippa columbiae*		E [1]
Dwarf evening primrose	*Oenothera pygmaea*		T
Hoover's desert parsley	*Lomatium tuberosum*		T
Northern wormwood	*Artemisia campestris borealis var. wormskioldii*		E
Birds			
Aleutian Canada goose [3]	*Branta canadensis leucopareia*	T	E
American white pelican	*Pelecanus erythrorhychos*		E
Bald eagle	*Haliaeetus leucocephalus*	T	T
Ferruginous hawk	*Buteo regalis*		T
Peregrine falcon [3]	*Falco peregrinus*	E	E
Sandhill crane [3]	*Grus canadensis*		E
Mammals			
Pygmy rabbit [2]	*Brachylagus idahoensis*		E

Notes:
[1] T = Threatened; E = Endangered
[2] Likely not currently inhabiting Hanford Site
[3] Incidental occurrence
Source: Neitzel 1996

No plants or mammals on the Federal endangered species list are known to exist at Hanford Site. Three bird species found at the Hanford Site, however, are on the Federal list of threatened and endangered species. Also, several species of plants and animals found there are under state consideration for formal listing. Table 4.2 lists the threatened and endangered species inhabiting or potentially inhabiting the Hanford Site.

4.6 CULTURAL RESOURCES

Information regarding local cultural resources can be found in the Hanford Site NEPA Characterization report (Neitzel 1996). Two hundred and eighty-three prehistoric sites have been found on Hanford Site (Neitzel 1996). Prehistoric archaeological sites common to Hanford Site include remains of numerous pit house villages, various types of open campsites, cemeteries, spirit quest monuments (rock cairns), hunting camps, game drive complexes, and quarries in mountains and rocky bluffs (Rice 1968a; 1968b; 1980). No cultural or archeological sites or artifacts are known or suspected to be present at the ATG Site (Ecology 1995).